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Rubber Research Scheme,

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VALUE TO RUBBER GROWERS OF THE WORK IN LONDON OF THE CEYLON RUBBER RESEARCH SCHEME

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A MEMORANDUM ELABORATING THE STATEMENT MADE BY MR. MARTIN TO THE EXECUTIVE COMMITTEE OF THE SCHEME IN JULY, 1929, AND SUBMITTED TO AND APPROVED BY THE LONDON COMMITTEE ON 31st JANUARY, 1930.

VALUE TO RUBBER GROWERS OF THE WORK IN LONDON OF THE CEYLON RUBBER RESEARCH SCHEME.

THE demand for rubber arises from its unique physical properties, but the fact that rubber and articles made from it are not as uniform in their qualities as articles made from materials commonly used in engineering and allied industries is a serious handicap in the way of more extended application. It is the aim of the work in London to improve the uniformity of rubber with a view to promoting a wider sphere of usefulness, lower manufacturing costs in Europe and America, greater sales of rubber articles and an improved demand for the raw material.

For this purpose a study is being made of the effect of plantation practice on the more important properties of rubber. The information obtained is useful to the rubber grower not only because it ensures that methods of preparation are fundamentally sound, but also because the more thoroughly the behaviour of rubber is understood, the easier it is to control, resulting in cheaper manufacturing costs, a wider scope and an improved demand.

The practical value of this procedure is illustrated by reference to the work on problems connected with vulcanisation which received a considerable amount of attention several years ago. At that time manufacturers were handicapped in their use of plantation rubber by serious variations in vulcanising properties, and there is no doubt that the work of plantation chemists, by providing a wealth of knowledge concerning the factors involved, did much to

remove a difficulty which at one time seriously militated against the use of plantation rubber.

Since then many changes have occurred in manufacturing practice in Europe and America and problems connected with uniformity have grown more complicated. More than one property requires consideration before a sample can be pronounced free from abnormality. A detailed investigation of this question has been made in London, as a result of which it is considered that more active steps may now be taken to obtain intrinsic uniformity in the East. For this purpose it is proposed to study the product of all rubber producing units in Ceylon and to carry out investigations in situ with a view to suggesting a remedy where abnormalities are found.

PLASTICITY.

With the development of modern methods of manufacture new difficulties have arisen in the use of plantation rubber. For this reason problems connected with plasticity now occupy a prominent position in the programme of work in London. A considerable amount of difficulty is experienced by many manufacturers in plasticising and moulding to shape some consignments of first grade rubber, but the same difficulty is not experienced with crudely prepared material such as the lowest grades of rubber. If an appreciable amount of low grade rubber or reclaim is mixed with the best grades the difficulties of manipulation are decreased. Consequently the poor and irregular plasticity of some consignments of first grade crepe and sheet interferes with the demand for carefully prepared rubber and improves that for crudely prepared material. Interested parties sometimes assert that the quality of first grade rubber is improved by mixing with it a certain amount of reclaimed rubber, because the latter being soft and tacky enables the new rubber to be worked more easily and to be mixed more thoroughly with the necessary compounding ingredients. If regular and large supplies of first grade rubber of satisfactory plasticity were forthcoming it would

undoubtedly increase the value of well-prepared material compared with that of reclaim and crudely prepared rubber. Moreover, if the whole of the better grades of plantation rubber were uniformly plastic, they would lend themselves more readily to developments in manufacture which are essential to the progress of the industry as a whole.

Considerable progress has been made in London with the investigations on plasticity. When the study of this question was commenced at the Imperial Institute by the London staff of the Ceylon Research Scheme little was known about the subject apart from general experience. From a crude and unreliable method of determination one has been developed which promises to be quick and accurate and, in the opinion of the London staff, a marked improvement on methods employed elsewhere. This has involved a considerable amount of work which was only completed last year.

A preliminary examination of the extent of variability in plasticity of rubber from about twenty-five estates in Ceylon showed that it was appreciable, and the effect on plasticity of a number of factors in preparation was accordingly studied. Two important conclusions have so far been arrived at, (1) the use of sodium bisulphite has an appreciable hardening effect, and (2) the conditions under which rubber is stored in Europe, may have considerable influence upon plasticity. Investigations are still proceeding with regard to the effect on plasticity of factors in preparation, and arrangements have been made for the effect of conditions of storage to be more fully explored. Preliminary experiments also showed that machine-dried crepe was more uniformly plastic than other grades of crepe and sheet, but this will require confirmation by many more experiments before it can be definitely accepted.

The possible effect of this work on factory practice in the East is naturally of considerable interest to the rubber grower. There are many possibilities of which the most obvious is that a demand might arise for a particular

type of rubber such as machine-dried crepe, or, as it is proposed to ascertain which estates are supplying rubber with abnormal properties and to study the preparation of rubber on these estates, the work may lead to recommendations for the modification of methods of preparation on individual estates.

It must be remembered, however, that other organisations besides those of the rubber producers are working on problems of plasticity, and judging from the parallel case of vulcanisation it is expected that the work of chemical manufacturers on softeners, of rubber manufacturers on manipulation, of reclaim manufacturers on the perfection of their product, and of rubber producers on causes of variation will eventually lead to a method of control which, although it may not revolutionise present procedure in the East, will nevertheless increase the usefulness of rubber and improve the value of the better grades of material.

INVESTIGATIONS SOLELY FOR THE BENEFIT OF THE PLANTER.

No attempt is made in this outline to give detailed reasons for each item in the programme of work. Rubber is the basic material of a wonderful assortment of manufactured articles involving different conditions of manufacture and service, and calling into play different properties. It is not a simple matter to decide which properties can be studied with the greatest advantage, but the close co-operation between planters and manufacturers on the London Committee has been of considerable value in enabling the staff to arrange that their tests shall be of the maximum utility. For this purpose it has been necessary to devote some time to a study of what may appear at first sight to be manufacturing problems such as the control of mastication, vulcanisation of technical mixings, and the ageing of vulcanised rubber. As explained in the introduction the sole object of these investigations is an improvement in the demand for first grade plantation rubber; they are therefore of considerable value to the rubber

grower and require study from his point of view. The work on mastication was undertaken in order that the results of plasticity tests should have the greatest practical value. The work on the vulcanisation of technical mixings has made it possible to classify the different types of variation encountered in manufacturing practice and to carry out investigations to obtain uniformity. The work on the ageing of vulcanised rubber has prevented the approval of samples which gave satisfactory results when tested soon after vulcanisation but which had poor ageing properties and might have given poor service. For example, in connection with the study of the quality of air-dried sheet now receiving so much attention in Ceylon it was shown that one darkening agent tried was unsuitable and that drying without smoke under certain conditions might give undesirable properties.

It will be seen that many considerations enter into the reasons for investigations in London. Although the objects may not always be apparent to those who are not familiar with manufacturing operations it cannot be too strongly emphasised that no investigation is carried out by the staff in London unless it will directly or indirectly benefit the rubber grower.

COMPETITION BETWEEN RUBBER AND OTHER MATERIALS.

Although plantation rubber is in the fortunate position of having no serious rival at present with regard to its principal use (rubber tyres), there are a number of uses where competition already occurs.

A recent newspaper article by John Haworth, Secretary of the India Rubber Manufacturers' Association, states: "In practically every branch rubber is faced by competition of products which fulfil the same functions, although not so efficiently". In order to meet this competition attention is being given in London to the determination of the technical factors which hinder the use of plantation rubber for

specific purposes and endeavours are being made to ascertain whether special types can be prepared which will give the necessary measure of superiority over alternative materials. In this connection investigations are proceeding with a view to increasing the usefulness of plantation rubber with respect to (a) ebonite, which has to compete with synthetic products and (b) tape and thread for which fine hard Para is still frequently used. With regard to the investigations for the improvement of ebonite, the Rubber Research Scheme is co-operating with the Research Association of British Rubber Manufacturers and the Electrical Research Association.

In conclusion, the work in London is designed to improve the usefulness of plantation rubber by preventing the adoption of unsound methods of preparation, by increasing uniformity, by encouraging and extending the use of first grade material, and assisting it to meet competition from alternative products.

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